DOCKET FILE COPY ORIGINAL

ORIGINAL

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to	)	
Revise the Private Land Mobile Radio	)	PR Docket No. 92-235
Services and Modify the Policies	)	
Governing Them and Examination of	)	
Exclusivity and Frequency Assignment	)	
Policies of the Private Land Mobile	)	
Services	)	

To: The Commission

Petition For Reconsideration and/or Clarification

Respectfully submitted,
Dataradio COR, Ltd.

Filed by:
Albert J. Catalano
CATALANO & PLACHE, PLLC
3221 M Street, N.W.
Washington, D.C. 20007-3616
(202) 822-9388

ITS ATTORNEYS

Date: August 5, 1999

TABLE OF CONTENTS

SUMMARY

Dataradio COR, Ltd. ("Dataradio" or "Dataradio COR") a member of the Dataradio Group of Companies is filing this "*Petition For Reconsideration and/or Clarification*" of the *Second Memorandum Opinion and Order in PR Docket No. 92-23.* By this Petition, Dataradio seeks to have the Commission specifically declare that the ten channel pairs designated for low power data use in the "Industrial/Business" pool under the spectrum proposal submitted by the Land Mobile Community Council ("LMCC") in this proceeding will be "data-only" channels and will not be available for voice use, even on a secondary basis.

A primary focus of Dataradio COR is on fixed data applications for private wireless business and industrial users. Among its customers are the utilities, petrochemical, transportation, water, summary and defense markets. Dataradio is filing this petition because of its concern, both as a manufacturer and on behalf of its user base, that wireless data applications in the 450-470 MHz refarming bands will not be able to reach their maximum potential under the LMCC proposal.

The clarification of the LMCC plan requested by Dataradio is necessary to assure that the growing needs of the private wireless user marketplace for data applications will not be impeded by the incompatibility of voice and data systems attempting to share the same channels. Interference from voice transmissions will not only lead to spectral

inefficiencies in data systems but will create serious safety hazards for users of fixed wireless telemetry in such industries as oil, gas, transportation and manufacturing.

Shared use of these channels with voice is particularly inequitable in light of the large numbers of voice channels specifically proposed under the LMCC plan, in addition to the voice channels already allocated in the UHF band. Of the 104 channels proposed under the plan, only 10---or less than ten percent----are available to business and industrial users for wireless data. The unfairness of this disproportionate allocation is further compounded by requiring data users to share the only channels allocated for their use with incompatible voice systems.

The availability of these ten low power channels for data-only is important to manufactures who are designing efficient and cost-effective data and telemetry systems, and to users who wish to utilize these systems unimpeded by sharing arrangements that reduce performance. As "data-only" channels, these frequencies will be key for the continued design and development of state-of-the-art data systems to serve the increasing needs of American business.

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to	)	
Revise the Private Land Mobile Radio	)	PR Docket No. 92-235
Services and Modify the Policies	)	
Governing Them and Examination of	)	
Exclusivity and Frequency Assignment	)	
Policies of the Private Land Mobile	)	
Services	)	

To: The Commission

Petition For Reconsideration and/or Clarification

Dataradio COR, Ltd. ("Dataradio" or "Dataradio COR"), a member of the Dataradio Group of Companies by its attorneys, and pursuant to Section 1.429 of the Commission's Rules (47 C.F.R. § 1.429) hereby files this Petition for Reconsideration and/or Clarification of the *Second Memorandum Opinion and Order in PR Docket No. 92-235. ("Second MO&O"* or *"Order").*[1] By this petition, Dataradio seeks to have the Commission specifically declare that the ten channel pairs designated for low power data use in the "Industrial/Business" pool under the spectrum proposal submitted by the Land Mobile Community Council ("LMCC") will be "data-only" channels and will not be available for voice use, even on a secondary basis.[2] This is consistent with the

[1] *64 FR 36258, July 6, 1999*

[2] These channel pairs are 462.2125/467.2125; 462.2375/467.2375; 462.2625/467.2625; 462.2875/467.2875; 462.3125/467.3125; 462.3375/467.3375; 462.3625/467.3625; 462.3875/467.3875; 462.4125/467.4125; and 462.4375/467.4375.

Commission's recent proposal to reject voice transmissions as a permissible use on channels specifically set aside for wireless medical telemetry.[3]

This clarification is necessary to assure that the growing needs of the private wireless user marketplace for data applications will not be impeded by the incompatibility of voice and data systems attempting to share the same channels. Interference from voice transmissions will not only lead to spectral inefficiencies in data systems but will create serious safety hazards for users of fixed wireless telemetry in such industries as oil, gas, transportation and manufacturing.

Shared use of these channels with voice is particularly inequitable in light of the large numbers of voice channels specifically proposed under the LMCC plan, in addition to the voice channels already allocated in the UHF band. The availability of these ten low power channels for data-only is important to manufactures who are designing efficient and cost-effective data and telemetry systems, and to users who wish to utilize these systems unimpeded by sharing arrangements that reduce performance. As "data-only" channels, these frequencies will be key for the continued design and development of state-of-the-art data systems to serve the increasing needs of American business.

---

[3] *In re: Amendment of Parts 2 and 25 of the Commission's Rules to Create a Wireless Medical Telemetry Service, ET Docket 99-225, FCC 99-182, released July 16, 1999, at para. 33.*

I. As A World Leader In State-of-Art Data Systems, Dataradio Has An Interest In Policies That Impact Data Applications In The Bands Subject To Refarming.

Datatradio COR is part of the Dataradio Group of Companies which also include Dataradio, Inc. and Dataradio Corporation.[4] Collectively, the Dataradio companies are engaged in the development, manufacture and implementation of a wide range of wireless products and networks that support data applications for both mobile and fixed uses in the Public Safety and private wireless communities.

A primary focus of Dataradio COR is on fixed data applications for private wireless business and industrial users. Its products include a variety of data and telemetry applications such as: Supervisory Control and Data Acquisition Systems ("SCADA"); Data Acquisition Systems; Automatic Vehicle Location ("AVL") systems; inventory management; automation and control systems; Global Positioning Systems ("GPS"); and robotics. Dataradio COR serves the data application needs of users in almost 40 countries around the world. Among its customers are the utilities, petrochemical, transportation, water, construction and defense markets.

The company has developed wireless data products for the UHF, VHF and 900 MHz bands. It continues to strive hard in the development of leading edge technology to meet the policies adopted by the Commission in its refarming proceeding. Dataradio COR is filing this petition because of its concern, both as a manufacturer and on behalf of

[4] Dataradio COR was a Division acquired from the EF Johnson Company and until recently was known as Johnson Data Telemetry Corporation.

its user base, that wireless data applications in the 450-470 MHz refarming bands will not be able to reach their maximum potential under the LMCC proposal.

To provide private business and industrial users with the greatest benefits, wireless data systems in these bands should be allowed to develop in an environment free from potential interference from incompatible uses, such as voice. If the ten channels designated for data use under the LMCC plan are protected as truly "data-only" channels, they will serve as a model environment for manufacturers to develop better and more sophisticated applications of data. In turn, these innovations will benefit the private user community with more cost effective and spectrum efficient technology.

II. The Dataradio Petition Is Ripe For Review And Should Be Considered By The Commission.

The Commission implemented the refarming proceeding in PR Dk. 92-235 to "develop an overall strategy for using the spectrum" in the private land mobile allocations "more efficiently to meet future communications requirements."[5] In so doing, it acknowledged that this is "an era of unparalleled demand for radio spectrum to provide

---

[5] *Report and Order and Further Notice of Proposed Rulemaking, PR Dk No. 92-235, 10 FCC Rcd 10076, (1995), at para. 2 ("First R&O").*

the exciting array of new wireless services."[6] The Commission specifically recognized the value of low power systems.[7]

In consolidating the Private Land Mobile Radio Services ("PLMRS") in the *Second Report and Order* in this proceeding, the Commission again emphasized the need for designated low power channels and directed the frequency coordinators to develop a consensus plan for low power operations by October 17, 1997.[8] On June 4, 1997, the frequency coordinators, through LMCC, submitted a plan in which they recommended that 104 former 12.5 kHz offset channel pairs (14 channel pairs in the Public Safety Pool and 90 channel pairs in the Industrial/Business Pool) be set aside for low power operations.[9]

Of these low power channels, 10 channel pairs in the Industrial/Business pool were specifically designated for data or "non-voice" use. However, the plan proposes that voice operations "could" be allowed on a "secondary basis". (See LMCC letter, Attachment 1 herein, at 5). It is this potential use of these channels for voice operations that Dataradio seeks to have the Commission remove in this petition.

---

[6] *Id.*

[7] *First R&O, at 10110.*

[8] *"Second R&O", 12 Fcd at 14340-41.*

[9] *See* Letter from Larry A. Miller, President, LMCC, to Daniel B. Phythyon, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, dated June 4, 1997 (Attachment 1 hereto). In addition to the 104 former offset channels, LMCC recommended that the 6.25 kHz channel directly above and below these channel pairs be designated for low power use.

This issue is ripe for consideration at this time for several reasons. First, the LMCC plan was never put out for public notice and comment. Therefore, this is the first opportunity for Dataradio to address the LMCC plan on the record. Moreover, because of potential interference issues with medical telemetry equipment from high power systems on the 12.5 kHz offset channels, the LMCC plan still has not been adopted and remains pending before the Commission.[10] In fact, in its *Order* the Commission stressed that *only* when it "has satisfied itself that the plan is viable, and consistent with the Commission's Rules" will the Wireless Telecommunications Bureau issue a Public Notice stating that the plan has been accepted.[11]

Since the LMCC plan was first proposed more than two years ago, there has been unprecedented growth in data applications and uses. These dynamic and dramatic marketplace changes, which are still in their infancy, will significantly impact the environment in which wireless users operate. They should be considered *before* the LMCC plan for the low power channels is adopted.

Unless the Commission timely clarifies that voice use will not be allowed on the "data-only" channels, the development of wireless data technology in the refarming bands could be unnecessarily harmed and fixed wireless telemetry users exposed to serious safety hazards from voice interference. At the present time, low power voice users are

[10] *Second MO&O, at n. 37.*

[11] *Second MO&O, at n. 82.*

able to be licensed on the channels designated under the LMCC plan as "data" channels.[12] The licensing of these voice users could make future coordination with data users unnecessarily difficult in some regions of the country. The more voice users that are licensed the worse the situation will grow. Accordingly, the current petition is ripe for review and should now be considered by the Commission.[13]

III. The Continued Growth In Data Applications Demonstrates That The Ten Low-Power Channels Should Be Designated As "Data-Only".

It is well documented that data applications for both mobile and fixed uses are growing at unprecedented levels. The Commission has recognized this "growing market for wireless data services."[14] The unquestionable evidence demonstrates that the data market is still evolving with a wide variety of new products and services expected in the coming months and years.

---

[12] While the Commission has frozen applications from high power users on the offset channels pending the outcome of interference studies concerning these users and medical telemetry, the freeze does not apply to low power voice users. *Second MO&O, at n. 37.* Thus, low power voice systems can be licensed on the offset channels designated under the LMCC plan as "data" channels.

[13] There is little question that the facts presented herein are timely for review under 47 C.F.R. § 1.429 (b) (1) and (2). Moreover, under 47 C.F.R. § 1.49 (b) (3), the Commission has broad authority to address an issue simply where it is in the public interest to do so.

[14] *In re: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services. FCC 99-136, released June 24, 1999, at 4 ("FCC 1999 Annual Report").* Although this report is primarily intended to inform Congress on the competitiveness of the commercial services, it also serves to document the rapid growth of data and the needs of the American business and industrial communities.

These sweeping changes are happening across the industry. Analysts expect sales of automatic data collection systems to increase annually by at least 16 percent, pushing them near the $3 billion mark by the end of the decade.[15] It is also expected that RF terminals that drive wireless data collection networks will sell at double the rate of terminals designed for hard-wired networks.[16] With an annual growth rate of 30 percent over the past five years, 1999 revenues for the portable data recorder (PDR) market will be at $1.6 billion.[17] At this growth rate, revenues by the year 2001 will reach almost $3 billion.

In addition to enhanced messaging services, the mobile wireless data industry encompasses a wide array of services ranging from vehicle tracking from satellites to wireless Internet connections via portable computers.[18] Many of these market sectors are experiencing record growth. It is estimated that hand held computing devices, (personal digital assistants or "PDAs"), used by many mobile users to access the Internet, grew by over 61 percent between 1997 and 1998.[19]

---

[15] *Manufacturing Systems, February, 1996, "Flying Without Wires".*

[16] *Id.*

[17] *Id.*

[18] *FCC 1999 Annual Report., at n.312.*

[19] *Id., at n. 308.*

Similar levels of growth are expected with wireless fixed data applications, including telemetry.[20] The uses of fixed wireless telemetry in industry and business are already numerous and the potential for additional applications is even greater. The applications for fixed wireless telemetry include: the monitoring of gas, electric, and water utility meters; gas and oil pipelines; vending machines; alarm systems; parking meters; streetlights; smoke/fire detectors; personal computer printers; factory process systems; photo copiers; and railway and other transportation systems.[21]

As the Commission has acknowledged, the potential growth for the fixed wireless data market is great with many segments of the market still untapped.[22] Only about two percent of the approximately 270 million utility meters in the United States have been linked to telemeter systems. [23] At least one report finds that 37 percent of these will be connected to fixed wireless networks within the next five years. [24] Another analyst predicts that there is an "opportunity for 130 million (non-utility) remote monitoring sites nationwide".[25] This is in addition to the millions of utility applications.[26]

---

[20] Telemetry is the transmission and measurement of data from a remote source. With fixed wireless telemetry, the objects that contain the wireless sensors, such as utility or gas meters are stationary.

[21] *FCC 1999 Annual Report, Appendix G at 56-57.*

[22] *Id., Appendix G, at 64-65.*

[23] *Id., Appendix G, at 65*

[24] *Id., Appendix G, at 65.*

[25] *Id., Appendix G, at 65.*

[26] *Id., Appendix G, at 65.*

An analyst from the Yankee Group sums up the dynamic potential for fixed wireless telemetry:

> [T]elemetry will grow significantly over the next five years, making noticeable impact on the $200 billion deregulating energy industry and other industries. The value of telemetry, though virtually unrecognized today is increasing as it becomes technologically feasible and cost-effective. Its possibilities are vast.[27]

In this dynamic environment, the Commission should adopt a regulatory scheme that assists and encourages the development of fixed wireless data and telemetry technologies for the business and industrial communities. At a minimum, this means that the 10 channels proposed for low power use in the LMCC plan should be specifically designated as "data-only" with no voice use, even on a secondary basis.

IV. Voice Use On The Data Channels Is Incompatible And Should Be Rejected On Both Technical And Policy Grounds.

For both technical and policy reasons the Commission should make clear that no voice transmissions will be allowed on the 10 low power channels designated in the LMCC plan as "data" channels. As detailed in the attached affidavit of Mark A. Christensen, data and voice systems operating on the same channel in a shared environment are not compatible and could lead to safety hazards for wireless telemetry

---

[27] *Id., Appendix G, n.33.*

users.[28] Shared use will lead to less efficient data operations, frustrating the efforts of manufacturers to design the most cost-effective and spectrally efficient data equipment.

This is particularly inequitable in light of the large number of channels available for voice use under the LMCC plan and elsewhere in the existing UHF allocations (e.g. 14 channels in the 462.5375-462.7375 and 467.5375-467.7375 MHz bands for the "Family Radio Service"). Of the 104 channels proposed under the plan, only 10---or less than ten percent----are available to business and industrial users for wireless data. The unfairness of this disproportionate allocation is further compounded by requiring data users to share the only channels allocated for their use with incompatible voice systems.

As documented by Mr. Christensen, transmissions on a shared channel from a voice system can often result in spectral inefficiencies and inaccuracies in the data system. In some cases, this voice interference could cause a data application to lock and shut down entirely, resulting in loss of valuable data and time, as well as unnecessary repair costs. In cases where safety issues are involved, interference from voice systems is outright dangerous.

This is particularly serious in light of the likely data users who will operate on these frequencies. The LMCC proposal recognizes that the target market for the 10 low power "non-voice" or data channels are "those low power users employing wireless non-voice transmitters for remote control of medical devices, cranes, robotics, etc. who need protection at a given site; *and whose operations could suffer significant safety hazards if*

[28] *Attachment 2 herein.*

shared with voice operations.[29] As Mr. Christensen documents, this danger is very real. He notes for example that the loss of an RF link to a pump filling up a remote oil tank could result in the tank being overfilled. Should the tank rupture a serious safety situation and environmental disaster would occur.

Under these circumstances, it is difficult to imagine why the Commission would allow voice operations, even on a secondary basis. While it is true that the interfering voice transmission operating on a secondary basis could be shut down after the fact, this does little for those who may be injured or killed as a result of the interfering signal. In fact, it is this very concern of interference with medical telemetry equipment that has caused the Commission to delay the implementation of the LMCC plan and to now search for an entirely new spectrum allocation for medical uses.

In addition to the obvious safety risks, allowing voice use on these channels will frustrate many of the marketplace objectives of the refarming proceeding. In creating the refarming spectrum, the Commission sought to enhance the deployment of new technologies and to promote product development. The Commission further sought to allow private licensees and equipment manufacturers the opportunity to introduce new applications to existing services and for users to make equipment investment decisions which best satisfy their needs.[30]

None of these objectives will be furthered by allowing voice use on the low power channels. If corrupted with voice transmissions, these channels will not be able to serve

---

[29] *Attachment 1, at 5.*

[30] *First R&O, at para. 3.*

as a model environment for the development and deployment of future wireless applications, including telemetry. As noted by Mr. Christensen, to avoid interference problems, data applications will be less efficient and more costly for the ultimate user.

The Commission recently proposed to set aside spectrum specifically for a Wireless Medical Telemetry Service.[31] Recognizing the importance of allowing the service to accommodate its intended use, the Commission declined to further a proposal by the American Hospital Association (AHA) to allow voice communications on the channels set aside for medical telemetry. "Allowing voice transmissions could encourage equipment in this service to be used as a form of wireless intercom, rather than for its intended purpose of transmitting vital patient data."[32]

The intended purpose of the 10 low power channels in this proceeding is for *data* use and data use *only*. Voice transmissions should not be allowed on these channels, even on a secondary basis. This environment will result in the development of the most cost-effective and spectrally efficient data technology for the private business and industrial user communities.

---

[31] *In re: Amendment of Parts 2 and 25 of the Commission's Rules to Create a Wireless Medical Telemetry Service, ET Docket 99-225, FCC99-182, released July 16, 1999.*

[32] *Id., at para. 33.*

CONCLUSION

In view of the foregoing, Dataradio respectfully requests that the Commission grant the relief requested herein.

Respectfully submitted,

Dataradio COR, Ltd.

By: Albert J. Catalano

Albert J. Catalano
CATALANO & PLACHE, PLLC
3221 M Street, N.W.
Washington, D.C. 20007-3616
(202) 822-9388

ITS ATTORNEYS

Date: August 5, 1999

ATTACHMENT 1

LAND MOBILE COMMUNICATIONS COUNCIL

Writer's Address and Telephone Number:

AASHTO
Suite 249
444 N. Capitol Street
Washington, DC 20001

Tel: (202) 624-8480

MEMBERS

AASHTO
AAA
AMTA
API
ATA
AAR
APCO
CTIA
CSAA
FIT
FCCA
ITA
ITSA
IAFC
IAFWA
IMSA
ITLA
MRFAC
NASF
PCIA
TIA
UTC

June 4, 1997

RECEIVED

JUN - 4 1997

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Mr. Dan Phythyon, Acting Chief
Wireless Telecommunications Bureau
Federal Communications Commission
2025 M Street, N.W., Room 5002
Washington, D.C. 200554

Re: PR Docket No. 92-235
(Refarming)

Dear Mr. Phythyon:

In response to the Commission's request, the Land Mobile Communications Council (LMCC) hereby submits its plan for low power and full power operations on the channels previously known as the 450-470 MHz low power offsets. Such a plan is necessary to move forward as the Commission's refarming decisions have established that a portion of these channels will transition to full power use, with a portion of the channels dedicated to support low power operations. As discussed more fully below, the Commission has requested that frequency coordinators provide a consensus plan that defines operations and the specific channels on which they are allowed. As an umbrella organization including membership of the frequency coordinators with responsibilities in this band, LMCC urges the Commission to endorse its plan and move forward expeditiously to provide end users the benefits which refarming can provide once full implementation is allowed.

LMCC has reached a consensus which accommodates to the extent possible a variety of low power requirements, as well as the need for additional channels for full power operations. LMCC would be the first to admit, however, that a given user may find that this consensus does not meet all of his or her expectations. In essence, additional spectrum is required to meet fully all the needs to everyone's satisfaction. Given the absence of such an option at this time, however, LMCC has no choice but to reach some degree of compromise among the variety of needs in developing this plan which helps optimize the best of a congested situation.

... / ...

Summary of the LMCC Plan:

In summary, the LMCC plan establishes 50 of the 450-470 MHz band "offsets" as low power coordinated channels, 10 as coordinated non-voice channels and 25 as low power uncoordinated channels in the Industrial/Business pool. Also, the 5 central station alarm "offset" channels would carry a low power designation. In addition, the plan recommends that any of the new 6.25 kHz "drop in" channels which are directly adjacent to the designated low power offsets be similarly designated. LMCC has also incorporated a recommendation from the public safety community that 14 of the offsets in the public safety pool be designated for low power operation. As addressed more fully later in this document, LMCC's plan would provide users a variety of implementation and regulatory status options. For example, existing low power users could move to designated low power channels or remain on channels ultimately used for full power operation.

Finally, LMCC believes that users, multiple coordinators, and equipment manufacturers would benefit from some degree of certainty surrounding this plan. LMCC therefore recommends the Commission endorse the plan by incorporating the various power, height and use designations applicable to the different frequencies into the rules. We believe this will allow the Commission to lift the freeze and authorize full power systems on remaining 450-470 MHz "offset" channels expeditiously with confidence that a home exists for low power operations. In this regard, we note that the LMCC recommended plan is being submitted approximately four months ahead of the Commission's targeted requirement of October 17. [1] Therefore, we also urge the Commission to advance by 4 months its date when applications for full power operations on the remaining "offset" channels can be accepted by the Commission. In its Second Report and Order, the Commission decided it would provide low power users a 7 month period within which to move to the designated low power channels or decide to share with new full power users on the remaining "offsets." This decision was based on previous recommendations by LMCC and its members. LMCC's early submission of this low power plan should allow the Commission to accept applications for full power operations on the remaining 450-470 MHz "offset channels" beginning in January 1998, i.e., 7 months from today. [2]

LMCC believes that to the extent possible in the shared environment, its plan allows regulation to match market needs, provides higher quality of service for users,

---

[1] The Second Report and Order in PR Docket No. 92-235 required coordinators to submit the plan for low power within 6 months of publication in the Federal Register. That publication occurred on April 17.

[2] One LMCC member, the American Trucking Associations (ATA), does not support the January 19, 1998, date for acceptance of full power applications on the remaining former offset channels.

minimizes conflicts between low power/full power systems and improves overall spectrum efficiency.

Rationale Behind The LMCC Plan:

In developing this recommendation, it was necessary to understand the environment which already exists for low power users. Today the 450-470 MHz band offset channels support thousands of these low power users with 25 kHz equipment. These existing systems are on channels which are spaced 12.5 kHz from the long-standing "primary" full power channels, and only 6.25 kHz from the new 6.25 kHz drop-in channels created in the Commission's refarming proceeding. Within the low power category, a wide variety of operations are deployed and different coordination techniques have been used, each responsive to particular types of low power use.

For example, industrial operations, manufacturing plants, and some businesses use the low power channels for in plant and on campus communications, including both voice and remote control of heavy machinery. Also, these channels support traffic control in highway construction corridors. Site-specific coordination provides these users some degree of interference protection in the shared spectrum environment prevalent throughout the 450-470 MHz band. Because industrial/manufacturing complexes often provide a hostile radio environment, these low power users have recommended that the current 2 watt limit be increased slightly to provide more reliable communications.

Other businesses, such as the construction trades, deploy the channels for operations which are more itinerant in nature and for which site-specific coordination would provide little benefit to the user. In addition, many small businesses deploying radios for on-site use are desperate to minimize costs, including those resulting from regulatory requirements.

In addition, a number of the offsets in the Industrial/Business pool which were previously assigned to the Business Radio Service are licensed by medical facilities such as hospitals for devices which monitor patients with heart problems. While critical in nature, today these medical systems operate on a non-coordinated basis and coexist with numerous co-channel 2 watt low power operations. Discussions with manufacturers of these medical devices indicate the systems operate at even lower powers, e.g., less than 10 milliwatts, providing transmitters a communications range up to approximately 35 feet.

Finally, while full power operations are a higher priority in public safety services, low power operations provide public safety users valuable communications for surveillance, tracking and other uses. Therefore, LMCC has incorporated into its plan recommendations of the Public Safety Communications Council for dedicated low power channels in the Public Safety Pool.

In developing a low power plan to move forward with refarming, the LMCC is guided by the Commission's request in its Second Report and Order in the Refarming proceeding, released March 12, 1997. The Commission decided that it would give coordinators in each of the two pools an opportunity to develop a consensus plan for low power operations which provides a compromise solution between low and full power operations. Such a compromise is necessary as the demands for both low and full power operations exceed the channels available and therefore require that the channels be shared among users. To the degree low power and full power operations can be licensed on separate channels, low power users will experience less interference and a higher grade of service. LMCC's plan separates co-channel low and full power users and going forward, would provide for low power use on new adjacent 6.25 kHz drop-in channels created by the Commission's refarming proceeding.

Ideally, low power operations would be totally separate from full power uses on the previously designated "primary channels" 12.5 kHz removed as well. However, in the 450-470 MHz band, that would require full power users already operating on "primary" channels to move. These channels support many users who have complex and extensive full power systems whose movement would further delay implementation of refarming. Also, LMCC estimates such moves would incur costs of approximately $1 billion per MHz. Finally, the Commission as yet has identified no vacant new spectrum to reaccommodate existing full power users or to accommodate additional full power users who otherwise could operate on these channels. For these reasons, LMCC believes separation of low power operations from incumbent full power operations on the adjacent "primary" channels is not possible at this time.

Details of the LMCC Plan

As noted above, a variety of uses exist for low power operations. Therefore, LMCC has developed the following recommended plan responsive to these requirements to the degree possible in this shared environment. Lists of specific channels for the various categories of low power use are attached as Appendices A through E.

I. Recommendations for Industrial/Business Pool:

1. Specify 50 — 12.5 kHz 450-470 MHz channel pairs for low power coordinated use:

- Target Market: Those low power users who need some degree of protection at a given site; e.g.; campus environments, manufacturing plants, etc.

- Maximum power of 5 watts ERP mobile/portable, 20 watts ERP base stations with maximum fixed station antenna height of 23 km (75 feet) above ground level. As shown in Appendix A, 10 of these 50 channels are

so designated on a nationwide basis with the remaining 40 channels designated for coordinated low power use within a 80 km (50 mile) radius of the top 100 urban areas. For sites beyond 80 km (50 miles) outside the top urban areas, full power is allowed on the 40 channels in accordance with frequency coordination procedures being finalized to minimize interference to both low and full power operations, e.g., contour analysis. This gives low power "protection" from full power but allows full power operation in less urbanized areas without the need for waivers.

— Site specific coordination and licensing required for both low and full power operations.

— Specific channels for this category are listed in Appendix A.

2. Specify 10 — 12.5 kHz 450-470 channel pairs for low power non-voice coordinated use nationwide:

— Target Market: Those low power users employing wireless non-voice transmitters for remote control of medical devices, cranes, robotics, etc. who need protection at a given site; and whose operations could suffer significant safety hazards if shared with voice operations. To maximize spectrum use, however, voice operations could be allowed on a secondary non-interference coordinated basis; any such use would be subject to removal should interference to non-voice operations occur.

— Maximum power of 2 watts ERP. Maximum antenna height of 7 meters (20 feet) above ground level for any fixed station.

— Site specific coordination and licensing are required.

— Specific channels for this category are listed in Appendix B.

3. Maintain a 2 watt power limit on the 5 "offset" channel pairs designated for central station alarm use.

— Specific channels for this category are listed in Appendix C.

4. Specify 25 — 12.5 kHz 450-470 channel pairs for low power non-coordinated itinerant use nationwide:

— Target Market: small business use, e.g., electricians, plumbers, others needing itinerant on-site communications or able to share with these users.

- Maximum power of 2 watts ERP. Maximum antenna height of 7 meters (20 feet) above ground level for any fixed station.

- New type acceptance grants for transmitters on these channels would specify that units must be capable of operation only on these 25 low power uncoordinated channels and on other UHF "dot/star" channels (464.5/469.5, 464.55/469.55, 467.85, 467.875, 467.9 and 467.925 MHz already used for similar low power and /or itinerant operations. This will help protect full power coordinated channels from additional co-channel conflicts that might occur from uncoordinated users.

- Licensing is required, but coordination is not required.

- Specific channels for this category are listed in Appendix D.

5. Provide the same low power designations on the 6.25 kHz channels immediately above and below the 12.5 kHz channels chosen for all four of the above-referenced low power categories.

6. Existing secondary licensees on the current 12.5 kHz 450-470 MHz offsets would have several options:

- Locate on one of the designated coordinated low power channels on a co-primary shared basis with other co-channel low power users. (Some licensees would have to change frequency, others would not.) Those employing 12.5 kHz equipment would also be co-primary with respect to full power users on adjacent channels 12.5 kHz removed. Those continuing to use 25 kHz equipment would remain secondary with respect to full power users on adjacent channels 12.5 kHz removed.

- Some low power licensees may also want to seek a protected service area (PSA) designation on one of the coordinated low power channels if/when the Commission provides that option. Given current channel usage, a PSA designation will not be possible for all existing licensees.

- Locate on one of the itinerant low power channels on a co-primary shared basis with respect to other co-channel itinerant users. Neither PSA's nor protection from full power operations on adjacent channels 12.5 kHz removed would be an option as there is no coordination for itinerant channels.

- Stay on currently licensed offset channel(s) on a secondary basis. Unless the current channel is one of the channels chosen for (1) or (2) above, the

low power licensee choosing this option would risk increased interference from new full power users added to the channel.

II. Recommendations for Public Safety Pool (Based on PSCC Input)

1. Specify 14 — 12.5 kHz 450-470 (offset) channel pairs for low power coordinated use nationwide.

- Maximum power of 5 watts ERP for all stations. Maximum antenna height of 20 feet (7 meters) above ground level for any fixed station.
- Site specific and station class specific coordination and licensing required.
- Specific channels in this category are listed in Appendix E.

2. Existing licensees on public safety low power secondary systems are advised to consider transition to one of the designated low power channels as soon as possible because the remaining 12.5 (offset) channel pairs in the public safety pool are now available for licensing of full power stations.

Summary

The LMCC plan designates a total of 50 of the 450-470 MHz offset channel pairs in the Industrial/Business pool and 14 channel pairs in the Public Safety pool specifically for low power operations and recommends the Commission incorporate this plan into the rules. Applications for full power operations on the remaining channel pairs which previously comprised a portion of the Industrial/Business or Public Safety 450-470 MHz "offset" channels would be accepted by the Commission beginning in January 1998 under the LMCC plan.

We also note that under the LMCC plan, users of ultra-low power on-site medical telemetry operations have several options. They could continue to operate on the 25 business channels designated for itinerant use, similar to their current shared uncoordinated operations on business channels today. In addition, the 10 coordinated non-voice low power channels may provide an option with even greater protection than these users have traditionally obtained. While requiring coexistence with somewhat higher powered operations, these users may also be able to share the 50 designated low power channels as those channels are licensed on a coordinated basis. Finally, we note that in its Memorandum Opinion and Order released on December 30, 1996, the Commission provided medical telemetry operations access to 10 channel pairs also used for airport support operations. LMCC nevertheless was unable to develop a rational plan at 450-470 MHz which meets the full expectations of representatives for the ultra-low power medical telemetry community. Those representatives have indicated a need for 2.5 MHz of contiguous low power channels with no interwoven full power operations and

preferably not even 2-5 watt co-channel industrial low power operations, which would require massive relocations. In LMCC's view, fully accommodating the expectations of the medical community representatives will require allocation of additional new vacant spectrum. LMCC supports the allocation of such new spectrum, tentatively including a reasonable portion to support medical telemetry operations.

Should you have questions concerning this plan, please contact Donald Vasek of the Personal Communications Industry Association (PCIA), who chaired the LMCC refarming task force. Mr. Vasek may be reached by phone at 703-739-0300, extension 3015, or by fax at 703-836-1608.

Regards,

Larry Miller
President

Attachments: Frequency List Appendices A, B, C, D and E.

APPENDIX A

Industrial/Business

50 Channel, Coordinated, Low Power Pool

451.1875	456.1875	452.1125	457.1125
451.2375	456.2375*	452.1375	457.1375
451.2875	456.2875	452.1625	457.1625
451.3125	456.3125	452.1875	457.1875
451.3375	456.3375*	452.2875	457.2875
451.3625	456.3625	452.3125	457.3125*
451.3875	456.3875	452.4125	457.4125*
451.4125	456.4125	452.4875	457.4875
451.4375	456.4375*	452.5125	457.5125*
451.4625	456.4625	452.5375	457.5375
451.4875	456.4875	452.6375	457.6375
451.5125	456.5125	452.6625	457.6625
451.5375	456.5375*	452.6875	457.6875
451.5625	456.5625	452.7125	457.7125
451.5875	456.5875	452.7625	457.7625*
451.6125	456.6125	452.7875	457.7875
451.6375	456.6375*	452.8125	457.8125
451.6625	456.6625	452.8375	452.8375
451.6875	456.6875	452.8625	457.8625*
451.7125	456.7125	452.8875	457.8875
451.7375	456.7375	452.9875	457.9875
451.7625	456.7625	462.1875	467.1875
452.0375	457.0375	462.4625	467.4625
452.0625	457.0625	462.4875	467.4875
452.0875	457.0875	462.5125	467.5125

* Indicates frequency pairs that are available nationwide

In addition to the channels listed above, the same low power designations apply to the channels 6.25 kHz immediately above and below these channels.

APPENDIX B

Industrial/Business

10 Channel, Non-Voice, Coordinated Low Power Pool

462.2125	467.2125
462.2375	467.2375
462.2625	467.2625
462.2875	467.2875
462.3125	467.3125
462.3375	467.3375
462.3625	467.3625
462.3875	467.3875
462.4125	467.4125
462.4375	467.4375

In addition to the channels listed above, the same low power designations apply to the channels 6.25 kHz immediately above and below these channels.

APPENDIX C

Industrial/Business

5 Channel, Central Station Alarm, Low Power Pool

460.9125	465.9125
460.9375	465.9375
460.9625	465.9625
460.9875	465.9875
461.0125	465.0125

In addition to the channels listed above, the same low power designations apply to the channels 6.25 kHz immediately above and below these channels.

APPENDIX D

Industrial/Business

25 Channel, Uncoordinated, Low Power Pool

461.0375	466.0375
461.0625	466.0625
461.0875	466.0875
461.1125	466.1125
461.1375	466.1375
461.1625	466.1625
461.1875	466.1875
461.2125	466.2125
461.2375	466.2375
461.2625	466.2625
461.2875	466.2875
461.3125	466.3125
461.3375	466.3375
461.3625	466.3625
462.7625	467.7625
462.7875	467.7875
462.8125	467.8125
462.8375	467.8375
462.8625	467.8625
462.8875	467.8875
462.9125	467.9125
464.4875	469.4875
464.5125	469.5125
464.5375	469.5375
464.5625	469.5625

In addition to the channels listed above, the same low power designations apply to the channels 6.25 kHz immediately above and below these channels.

APPENDIX E

Public Safety

14 Channel, Coordinated, Low Power Pool

453.0375	458.0375
453.0625	458.0625
453.0875	458.0875
453.1125	458.1125
453.1375	458.1375
453.8875	458.8875
453.9125	458.9125
453.9375	458.9375
453.9625	458.9625
453.9875	458.9875
460.4875	465.4875
460.5125	465.5125
460.5375	465.5375
460.5625	465.5625

In addition to the channels listed above, the same low power designations apply to the channels 6.25 kHz immediately above and below these channels.

ATTACHMENT 2

AFFIDAVIT OF MARK A. CHRISTENSEN

I, Mark A. Christensen, on this 3rd day of August, 1999, hereby declare under penalty of perjury the following:

1. I am the current Director of Engineering for Dataradio COR. I have a bachelors degree in Electrical Engineering from the University of Minnesota and have been an electrical engineer for the past 23 years. My experience includes 7 years with Motorola Comm, Schaumburg IL, and 13 years with EF Johnson, Waseca MN, 3 years with Johnson Data Telemetry/Dataradio COR, my work experiences have been in design and development of land mobile equipment and in engineering management.

2. The statements made in this Affidavit are based on my knowledge of the general principles of electrical engineering, laboratory testing and analysis and my real world technical and engineering experience of over 23 years.

3. Data and voice systems operating on the same channel in a shared environment are not compatible. The end result is inevitably harmful interference, with both technologies suffering. Depending on the use of a particular data application, the results can be inefficient, frustrating and even dangerous if safety issues are involved.

4. One of the major problems in being able to avoid interference between data users sharing a channel with voice is that data systems do not have cognitive abilities and thus can not monitor a shared channel to assure an interference-free environment.

5. A data system does not have the same ability to monitor a channel as does a voice user. Voice users can open squelch before transmitting to determine whether another user is attempting to use the same channel. The person monitoring can very quickly determine that the signal is not intended for them and is another user of the channel. The person listening on the voice system makes the decision if they are going to wait or transmit. It is a judgment call. In a data system, there is no human to make the judgment call.

6. Transmissions on the same channel by a voice system result in an inefficient use of data technology.

7. Competing transmissions on a shared channel from a voice system requires a great deal of wasted time and effort by a data system and leads to inefficiencies and inaccuracies in the system.

8. This is so because the data system must try to determine whether a particular transmission is meant for that system or not. The data system will start decoding to determine if: the received signal is valid (i.e. good data); or was in proper format but had errors due to noise; or was garbage data due to unknown causes. However, at no point will the data system be able to determine that the carrier that showed up in its receiver was really another user of the shared channel.

9. The results of the interference from an unwanted voice signal will vary depending on the sophistication of the data system as well as the type of architecture that is employed. In general, the more sophistication that is required to be built into the data system to avoid unwanted interference from voice, the higher the cost of manufacture and the higher the costs to the ultimate user. In some cases the added costs could price the equipment beyond the means of some users.

10. As stated, the results of voice interference will vary and in some cases could be devastating to the data system. In a polling scheme, the RTU will probably ignore the interference, *if* it was not actively polling. However, if it were polling, it might very well corrupt an otherwise valid block of data.

11. In a report by an exception system, the master might ask for retransmission, making a busy channel even busier. In some cases, an RTU could get hung up or lock. Many of these systems are simple "state" machines, meaning that at the completion of one task (or state) the next task will be started. Valid data corrupted by an interfering signal could expose a "bug" in the programming so that a task would not be completed and the RTU would not proceed to the next state.

12. In some circumstances an RTU could lock so badly that a field technician would be required to reset the unit to a known state. In severe cases, the "brain dead" unit could time out and stop transmitting completely, resulting in lost data, loss of valuable time, and unnecessary repair costs to the user.

13. Co-channel transmissions from voice systems will slow down throughput on a data system. Data systems are designed to minimize internal contention (i.e. data collisions). However, these systems do not handle, other incompatible users, such as voice, very well. The voice signal is perceived as a carrier and the data system will try to decode it. The resultant is "garbage" which will slow down throughput and cause the data system to be inefficient.

14. The length and frequency of some voice transmissions also contribute to the incompatibility between voice and data.

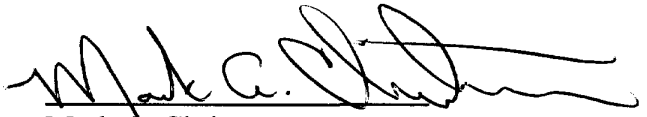
15. Data transmissions are usually short bursts followed by periods of inactivity, especially in data acquisition applications. Voice transmissions can vary in length with longer transmissions lasting several minutes. Therefore, a shared channel between several data users in a SCADA application has a much better chance of finding compatibility than would sharing a system with a voice user.

16. Voice users are generally mobile, further increasing the risk of interference to data users. These voice users tend to move around in a geographical area creating an unpredictable transmission environment and leading to greater risk of potential interference.

17. On the other hand, most of the low power data systems applications are point to multi-point and thus more compatible to share channels. The remotes in such systems are usually in a fixed location or are hand held data terminals confined to the inside of a manufacturing site and thus are not mobile in the sense that they do not change locals. Two watts of RF in a point to multi-point data system can achieve 5 to 10 mile links. Because of their fixed application, these low power data users can more easily coordinate and share a channel.

18. Interference from voice users can raise safety issues for data systems. SCADA (Supervisory Control and Data Acquisition) systems often control heavy equipment in remote locations that must be monitored and controlled in a timely fashion. For example, in both the oil and water industries, there are "pump off" sites where tanks are being filled. The pump that is filling the tank is remote and relies on the RF link to shut off the pump. If the wireless link is lost, there is nothing to stop a pump from filling a full tank. In such cases workers would have to be immediately dispatched. Such a breakdown would cause a dangerous environment for nearby workers and a potential environmental issue.

19. In my professional opinion, the many disadvantages associated with shared use of voice and data systems on the same low power channels far outweigh any potential benefits, even if voice is only allowed on a secondary basis. Corruption of these channels for data users due to harmful interference from voice transmissions will unnecessarily impede the deployment of spectrum efficient and cost effective data systems.



Mark A. Christensen
Director of Engineering
Dataradio COR Ltd

Certificate of Service

I, Albert J. Catalano, an attorney in the law firm of Catalano & Plache, PLLC, hereby certify that on this 5th day of August, 1999, I have served the foregoing "Petition For Reconsideration and/or Clarification" on the following, at the address shown, by First-Class U.S. Mail, postage-prepaid:

Larry Miller, President
Land Mobile Communications Counsel
444 N. Capitol Street
Suite 249
Washington, D.C. 20001

Albert J. Catalano